APPENDIX I
WATER RESOURCES ANALYSIS AND METHODOLOGY

SEA evaluated and analyzed the potential impacts to water resources that would result from the Proposed Action and Alternatives. This Appendix discusses SEA's approach for evaluating potential effects on water resources and focuses on the following areas: groundwater, floodplains, surface water, and wetlands.

The following sections describe the methods utilized to identify and evaluate the potential effects on water resources. The discussion includes the following:

1. Applicable regulations.
2. Sources and types of data collected.
3. Threshold screening process.
4. Analytic methods.

I.1 APPLICABLE REGULATIONS AND GUIDANCE

SEA reviewed the potential effects on water resources in accordance with Federal regulations and guidelines. These regulations include the following: (1) the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321-4347); (2) the Surface Transportation Board's (Board) regulations (49 CFR 1105); and (3) guidelines published by the Council on Environmental Quality (CEQ) (40 CFR 1500).

The potential effects were analyzed for the Proposed Action and various Alternatives to ensure compliance with other Federal, state, and local laws including the following:

1. Discharges into "Waters of the U.S." (including wetlands), regulated by Sections 320, 401, 402, and 404 of the Clean Water Act of 1977, as amended by the Water Quality Control Act of 1987 (P.L. 100-4); National Pollution Discharge Elimination System (NPDES) (33 U.S.C. 1342 *et seq.*); the Safe Drinking Water Act (42 U.S.C. 300 *et seq.*); Texas Pollution Discharge Elimination System (TPDES) (30 TAC 281.25(4); the Texas Surface Water Quality Standards (30 TAC 307.1-.10) and the Galveston Bay Estuary Program, which was established through the National Estuary Program under Section 320 of the Water Quality Control Act.

2. Construction Activities in "Navigable Waters," regulated by Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

3. Activities Located in Floodplains, regulated by Executive Order 11988, "Floodplain Management" (May 1977), the National Flood Insurance Act of 1968, and Flood Disaster Protection Act of 1973.

4. Activities that may affect federally designated scenic rivers regulated by the Wild and Scenic Rivers Act (16 U.S.C. 271 et. seq.).

5. Activities that may affect coastal resources as regulated by the Coastal Zone Management Act (16 U.S.C. 1451 et. seq.). In Texas, the Applicants must secure a consistency determination for the proposed project from the Texas GLO (who administers the Federal program) under the Texas Coastal Management Program (31 TAC 501). This consistency determination is typically issued through the 404 Permit Process from the USACE. The Applicant will provide this determination to SEA.

6. Activities that may affect state Coastal Preserves as designated by the Texas Coastal Preserve Program under the Coastal Management Program (31 TAC 501). Activities that may affect resources regulated by the Coastal Barriers Resources Act (43 U.S.C.).

7. Stormwater management discharges as regulated by the Minimum Design Criteria for Implementation of Certain Best Management Practices for Stormwater Runoff Treatment Options (2001) and the Storm Water Quality Management Guidance Manual (2001), published by the City of Houston, Harris County and the Harris County Flood Control District.

8. Activities that impact wetlands, regulated by Executive Order 11990, "Protection of Wetlands" (August 1978).

I.2 DATA SOURCES

SEA evaluated data from the following sources in its review of the potential effects on water and biological resources:

Public Domain Information

1. U.S. Geological Survey (USGS) 7.5-minute series topographic maps.

2. U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) maps.

3. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps.

4. Aerial photographs, including Texas Natural Resource Information Service (TNRIS) 1995 1-meter color digital orthophotographs, and 2001 ¼-meter color digital orthophotographs

5. Natural Resources Conservation Service (NRCS) Soil Survey for Harris County and US Department of Agriculture's Hydric Soils of the United States (1991).

6. Texas GLO, Galveston Bay Estuary Program, USFWS, Bureau of Land Management (BLM), and National Park Service (NPS) internet information about designated coastal management, estuaries, coastal preserves, wilderness areas, wildlife refuges and other sensitive environmental areas.

7. Department of the Interior, National Park Service National Inventory of Wild and Scenic Rivers.

8. Aquifer/Geological Map published by the Texas Bureau of Economic Geology.

9. Texas Surface Water Quality Standards (2000), Draft Year 2002 305(b) Summary of Impaired Water Bodies, and Draft 2002 305(b) Assessment.

Additional project specific information that was collected and used in the evaluation includes the following:

1. Consultation between SEA and the Texas Commission on Environmental Quality and Texas Department of Parks and Wildlife regarding special status species and water resources.

2. Consultation with the HCFCD regarding water quality, flooding, and biological resource issues.

3. Consultation with the USFWS regarding scoping, ESA compliance and fish and wildlife resources.

4. Field investigations of the proposed study areas by HDR Engineering, Inc. (HDR), the Applicants' environmental consultant and EEE Consulting, Inc. (EEE) a subconsultant to ICF Consulting Inc. (ICF), SEA's independent third party consultant.

5. Wetland Delineation Report and Delineation Map of waters of the U.S. prepared for the Applicants, and various addenda. The field delineation and delineation report were reviewed and verified by EEE.

6. A Voluntary Mitigation Measures Report prepared by the Applicants.

7. Conceptual drawings for the proposed bridges of all jurisdictional crossings and typical cross sections for various segments of the proposed facility from the Applicants.

8. A June 2002 submittal from the Applicants to the U.S. Coast Guard for Section 9 of the Rivers and Harbors Act.

9. An August 2002 submittal of a Section 404/401 Joint Permit Application from the Applicants to the USACE and TCEQ.

I.3 SCREENING PROCESS

The analysis focused on the potential for direct and indirect impacts to water resources that were associated with the No Action Alternative, the Proposed Action, and various Alternatives, which include construction of a new rail line segment and use of existing rail facilities. The analysis of potential water resource effects focused on possible construction and operational and maintenance activities involved with the new rail line segments of the Proposed Action, and Build Alternatives 1C, 2B, and 2D and the Original Taylor Bayou Crossing. The evaluation also included the potential for impacts to water resources from a hazardous materials release on the existing lines.

I.4 ANALYTICAL METHODS

The following sections discuss the assumptions, evaluation criteria, and analysis used to evaluate potential effects on natural resources. Information was gathered about the existing water resources and wetlands in the project area to evaluate potential effects from the Proposed Action and other Alternatives. The sections below discuss the approach for review of maps, field investigations, permit and mitigation requirements, and evaluation of potential effects.

I.4.1 Map Review and Analysis

The published maps, aerial photographs, and charts were utilized to identify water resources in the project area. A review was conducted of USGS topographic maps, NWI maps, Harris County maps, 1-meter and ¼ meter color digital orthophotographs, and applicant furnished maps depicting surface waters, wetlands, intermittent and perennial streams, ponds, and floodplains. Hydric soils were identified from the Hydric Soils of the United States (U.S. Department of Agriculture, 1991). Maps and published data characterizing the geologic formations and groundwater aquifers in the region were evaluated.

The Flood Insurance Rate Maps of the study area were reviewed to determine if the Proposed Action and Build Alternatives would occur within a 100-year or 500-year floodplain. Because construction activities would occur within a floodplain and could potentially affect water quality and flooding characteristics, the requirements of Executive Order 11988 on Floodplain Management were evaluated. Additionally, Letters of Map Revision (LOMR) and Conditional LOMR, which have been approved by the local Floodplain Administrator, were reviewed to determine the limits of the current FEMA designated and regulated floodplain.

I.4.2 Field Review

The project area was field investigated to determine the potential impacts to water resources including wetlands. The wetlands along each of the build alignments were delineated by HDR. in accordance with the Corps of Engineers 1987 Wetland Delineation Manual (USACE, 1987) and subsequent regulatory guidance. Wetlands and waters of the U.S. were delineated within about a 200-foot wide corridor along the alignment for the new construction portion of each Build Alternative. The location and area of isolated and jurisdictional wetlands and waters of the U.S. were determined in the field using a Trimble ProXRS Geographic Positioning Satellite (GPS) unit. The gilgai habitats within the Armand Bayou floodplain were measured using a 100-foot tape to calculate the percentage of depressional areas. The field delineation, jurisdictional determination and wetland delineation report prepared by HDR were reviewed by EEE, a subconsultant to ICF, SEA's independent third party consultant. A small amount of the project area along property owned by the City of Houston was not field delineated because right-of-entry to the property was not provided. In those cases, wetlands were identified from soil surveys, aerial photographs and orthophotographs, and NWI maps. The delineation and jurisdictional determination were performed in accordance with guidance from the USACE Galveston Regulatory Branch concerning the Supreme Court ruling in the Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178 (SWANCC, 2001). This ruling determined that the USACE could not exercise jurisdiction over isolated wetlands under Section 404 of the Clean Water Act. The determination of 404 jurisdiction was based on direct and indirect hydrologic connection. Determination of indirect hydrologic connection was

based on USACE guidance that wetlands located within a FEMA designated 100-year floodplain and those with a direct surface connection to water of the United States would be considered jurisdictional. During the field studies, personnel from HDR and EEE recorded the observed plant and animal species and identified plant communities.

I.4.3 Permits

The need for Federal, state and local permits was determined based on the information from the Applicant, the reference material, the field investigations, a review of local, state, and Federal permit requirements, and consultation with regulatory agencies. The need for mitigation for impacts to jurisdictional waters of the United States was determined based on consultation with the USACE, NMFS, and TCEQ and the Applicants' Joint 404/401 permit application to the USACE.

I.4.4 Evaluation of Effects

The evaluation of the effects was completed for the proposed site-specific project activities on water resources including wetlands. The planned construction and operations and maintenance activities were assessed in relation to the water resources present in the project area. The following potential effects on water resources or wetlands were evaluated:

1. Alteration of stream channels wetlands, and drainage channels.

2. Impact to the Armand Bayou Coastal Preserve and ecological resources from the proposed crossing of Armand Bayou.

3. Temporary or permanent loss of surface waters, floodplains, and wetlands associated with deposition of fill, construction of bridges and culverts, and maintenance activities.

4. Water quality impacts including turbidity and pollutant loading caused by fill activities and/or soil erosion from upland construction sites.

5. Water quality impacts from the discharge of stormwater from construction activities, from stormwater discharges if the facility were operated, and from a hazardous material spill.

6. Direct or indirect destruction and/or degradation of floodplain, wetland, coastal resources, and surface waters.

7. Alteration of water flow that could increase the uprooting or destruction of vegetation, cause bank erosion or flooding, or interfere with boat navigation in the rivers.

8. Potential degradation of groundwater quality or aquifer draw down in shallow aquifers from construction activities or operation and maintenance of the facility.